

Accordingly, the following is claimed:

1. A method of generating a substantially uniform static magnetic field in a significant volume comprising: arranging a plurality of electrically conductive coils of radius "r" along a common longitudinal axis, wherein each coil has at least one winding of electrically conductive material, separating said coils by a distance of between .5 r and 2 r, and applying direct current to said coils.

2. The method of claim 1 wherein each of said coils receives the same amount of direct current.

3. The method of claim 1 wherein said significant volume has a width of at least 125% of radius "r".

4. The method of claim 1 wherein said volume has a resting surface there within.

5. The method of claim 1 wherein said coils comprise a center coil, and a pair of outer coils.

6. The method of claim 1 wherein said coils comprise pairs of center coils, intermediate coils, and outer coils.

7. The method of claim 1 wherein said coils comprise a center coil, a pair of outer coils, and a pair of intermediate coils.

8. The method of claim 7 wherein each member of a given pair of coils has approximately the same number of windings.

9. An apparatus for generating a substantially uniform static magnetic field in a significant volume comprising: a plurality of electrically conductive coaxial coils of conducting material of radius "r" arranged about a common longitudinal axis, wherein each of said coils has at least one winding of electrically conductive material and is separated by a distance of between .5 r and 2 r, and wherein each of said coils is supplied with direct electrical current.

10. The apparatus of claim 9 wherein each of said coils receives the same amount of direct current.

11. The apparatus of claim 9 wherein said windings comprise copper wire.

12. The apparatus of claim 9 wherein said significant volume has a width of at least 125% of radius "r".

13. The apparatus of claim 9 wherein said apparatus has a resting surface disposed within said coils.

14. The apparatus of claim 13 wherein said resting surface is operable to support an afflicted human patient and to provide said magnetic field to said patient for any desired period of time.

15. The apparatus of claim 14 wherein said resting surface is nonferrous.

16. The apparatus of claim 9 wherein said coils comprise a center coil, and a pair of outer coils.

17. The apparatus of claim 9, wherein said coils comprise pairs of center coils, intermediate coils, and outer coils.

18. The apparatus of claim 9 wherein said coils comprise a center coil, a pair of outer coils, and a pair of intermediate coils.

19. The apparatus of claim 18 wherein each member of a given pair of coils has approximately the same number of windings.

20. A method of determining the spatial and physical characteristics of a coaxial arrangement of discrete, spaced apart coils operable to generate a volumetrically large substantially uniform magnetic field having a preselected magnetic field strength, uniformity, and volume, the method comprising:

selecting initial radii, inter-coil spacing, and number of windings parameters for an arrangement of coils operable to approximately produce the selected magnetic strength parameter;

determining the spatial magnetic field strength profile actually or theoretically produced by the application of electrical current to each of said coils of said arrangement;

adjusting the relative inter-coil spacing and number of windings parameters for the coils to equalize valleys and peaks in the spatial magnetic field strength profile and to more closely approximate the preselected uniformity; and

iteratively repeating the determining and adjusting steps until the preselected magnetic field strength, uniformity, and volume parameters are achieved.

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